

## Helminths of Varied Thrushes, *Ixoreus naevius*, and Robins, *Turdus migratorius*, from British Columbia

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**ABSTRACT:** From 1986 to 1992, 48 varied thrushes, *Ixoreus naevius* (Gmelin), and 17 robins, *Turdus migratorius* L., were collected in British Columbia and examined for helminths. Twenty-one helminth species were found in 46 varied thrushes, 11 in 17 robins. Four acanthocephalan species were found in varied thrushes with *Prosorhynchus cylindraceus*, the most prevalent helminth. It was the only species of acanthocephalan in robins. Five cestode species were found in varied thrushes including 2 (*Aploparaksis dujardini neoarcticus* and *Dilepis undula*) that were common to robins. Eight digenetic trematodes were found in varied thrushes; *Lutztrema monenteron* had high prevalence but 3 (*Tamerlantia zarudnyi*, *Urotocus rossitensis*, and *Mosesia chordeilesia*) consisted of single infections. Only 2 digenetic trematodes, *L. monenteron* and *Brachylecithum mosquense*, were found in robins. Of 5 nematodes found, *Capillaria obsignata* and *Capillaria quiscali* were most prevalent in varied thrushes and robins.

**KEY WORDS:** *Ixoreus naevius*, *Turdus migratorius*, British Columbia, Acanthocephala, Cestoidea, Nematoda, Digenea.

This paper is a report on the helminths found in varied thrushes, *Ixoreus naevius*, and robins, *Turdus migratorius*, in British Columbia. These passeriform birds are common on the Pacific coast of North America, but very little is known of their parasites.

### Materials and Methods

From 1986 to 1992, 48 varied thrushes and 17 robins were examined from collections in southern British Columbia. The birds were collected at Pearson College on Vancouver Island, at Lynn Canyon Ecology Centre in North Vancouver, and in suburban areas of Vancouver. Seven birds with no localities indicated were presumed to have been collected in southern British Columbia. Most of the birds had died accidentally as a result of collisions against windows, and 83% of them were found during September through March. The birds were classified as males, females, and juveniles. Twice as many male varied thrushes were found than females with a total of 31 males, 14 females, and 3 juveniles. Four male, 5 female, and 8 juvenile robins were collected.

The birds were frozen for later examinations for parasites. The digestive, respiratory, and excretory organs were examined by standard methods. Large organs such as the intestine were divided into 4 sections and scraped, and the sediment was examined under a stereoscope. Acanthocephalans were placed in tap water until the proboscides were extended. All of the helminths except nematodes were fixed in alcohol–formalin–acetic acid and then stored in 70% ethanol. Nematodes were placed directly into 70% ethanol. Scolices of cestodes and whole digeneans were mounted in Berlese chloral gum. These specimens were measured and drawn immediately after mounting. Nematode lengths were taken from outlines drawn with aid of a camera lucida and extrapolated with a map measurer. Taxonomic references used

were Amin (1985) for acanthocephalans, Schmidt (1986) for cestodes, Schell (1986) for digeneans, and McDonald (1974) for nematodes.

Accession numbers for specimens deposited in the U.S. National Museum (USNM) Parasite Collection, Beltsville, Maryland, are as follows: *Prosorhynchus cylindraceus* (USNM 82745), *Prosorhynchus paulus* (USNM 82746), *Aploparaksis dujardini neoarcticus* (USNM 82747), *Dilepis undula* (USNM 82748), *Monopylidium iola* (USNM 82749), *Passirilepis crenata* (USNM 82750), *Leucochloridium cardis* (USNM 82751), *Leucochloridium turdi* (USNM 82752), *Mosesia chordeilesia* (USNM 82753), *Tamerlantia zarudnyi* (USNM 82754), *Urotocus rossitensis* (USNM 82755), *Ascaridia galli* (USNM 82756), *Capillaria obsignata* (USNM 82757), *Capillaria quiscali* (USNM 82758), *Porrocaecum ensicaudatum* (USNM 82759), and *Syngamus merulae* (USNM 82760).

### Results

Twenty-two helminth species are listed in Table 1 with the numbers of infected varied thrushes and robins, mean intensities, and ranges. New host records are noted with asterisks: 15 for varied thrushes and 2 for robins. A total of 21 species was found in 46 or 96% of varied thrushes. Two of these hosts had a maximum of 7 parasite species and totals of 44 and 68 worms. The heaviest worm load in a varied thrush was 108 individuals. Only 11 helminth species were found in the 17 robins sampled. One robin had a maximum number of 7 parasite species with a total of 35 individuals. Two juvenile robins had heavy worm loads of 220 and 518. Ten of the 11 helminth species in robins were also found in varied thrushes, with *Brachylecithum mosquense* the

**Table 1. Helminths of varied thrushes and robins from British Columbia.**

Helminth taxon	Thrushes (N = 46)			Robins (N = 17)		
	No. infected	Mean intensity ± SD	Range	No. infected	Mean intensity ± SD	Range
<b>Acanthocephala</b>						
<i>Prosorhynchus cylindraceus</i> (Goeze, 1782) Schmidt and Kuntz, 1966	29*	4 ± 6	1–32	9	5 ± 5	1–17
<i>Prosorhynchus paulus</i> Van Cleave and Williams, 1951	1*	5				
<i>Pseudolueheia boreotis</i> (Van Cleave and Williams, 1951) Schmidt and Kuntz, 1967	8	2.5 ± 1.6	1–5			
<i>Sphaerirostris lancea</i> (Westrumb, 1821) Golvan, 1956	9	6 ± 9	1–31			
<b>Cestoidea</b>						
<i>Aploparaksis dujardini neoarcticus</i> Webster, 1955	22	5 ± 4	1–18	2*	4 ± 2	2–6
<i>Aploparaksis turdi</i> Williamson and Rausch, 1965	2	29.5 ± 10.5	19–40			
<i>Dilepis undula</i> (Schränk, 1788) Weinland, 1858	9*	3 ± 3.9	1–13	9	14 ± 32	1–105
<i>Monopylidium iola</i> (Lincicome, 1939) Schmidt, 1986	2*	19.5 ± 18.5	1–38			
<i>Passirilepis crenata</i> (Goeze, 1782) Sultanov and Spaskaja, 1959	3*	2 ± 0.8	1–3	5	20 ± 29	2–77
Unidentified cestodes	3	1 ± 0.5	1–2	3	1 ± 0.5	1–2
<b>Digenea</b>						
<i>Brachylaima fuscum</i> (Rudolphi, 1819) Joyeux, Baer, and Timon-David, 1932	6	2.7 ± 1.5	1–5			
<i>Brachylecithum mosquense</i> (Skrjabin and Issaïtschikoff, 1927) Shtrom, 1940				3	7.7 ± 5	1–14
<i>Lutztrema monenteron</i> (Price and McIntosh, 1935) Travassos, 1941	21	25.8 ± 24	2–76	5	2.2 ± 1.7	1–5
<i>Leucochloridium cardis</i> Yamaguti, 1939	2*	1				
<i>Leucochloridium turdi</i> Yamaguti, 1939	4*	20.8 ± 28.5	1–70			
<i>Mosesia chordeilesia</i> McMullen, 1936	1*	37				
<i>Tamerlania zarudnyi</i> Skrjabin, 1924	1*	3				
<i>Urotococcus rossitensis</i> (Mühlhling, 1898) Looss, 1899	1*	2				
<b>Nematoda</b>						
<i>Ascaridia galli</i> (Schränk, 1788) Freeborn, 1923	1*	1		1	21	
<i>Capillaria obsignata</i> Madsen, 1945	12*	6.6 ± 4.8	1–14	7	14 ± 14	1–44
<i>Capillaria quisqualis</i> Read, 1949	21*	4 ± 4.6	1–18	8*	9 ± 9.7	1–31
<i>Porrocaecum ensicaudatum</i> (Zeder, 1800) Lopez-Neyra, 1946	2*	1				
<i>Syngamus merulae</i> Baylis, 1927	2*	1		6	1.5 ± 0.8	1–3
Total 22 species	46/48	27 ± 27	1–108	17/17	30.5 ± 51.5	1–220

\* New host record.

exception. Taxonomic notes and comparisons of morphological data are arranged according to the helminths listed in Table 1.

**ACANTHOCEPHALANS:** Van Cleave and Williams (1951) described and illustrated 4 species of acanthocephalans from Alaska, which are now reported in British Columbia. *Lueheia adlueheia*, a species described by Werby (1938) in Washington, was not found in this study. While only *Prosorhynchus cylindraceus* was found in robins, 4 species were found in varied thrushes.

Mixed species infections consisted of 4 varied thrushes with *P. cylindraceus* and *Pseudolueheia boreotis*, 3 with *P. cylindraceus* and *Sphaerirostris lancea*, 2 with *P. cylindraceus*, *P. boreotis*, and *S. lancea*, 1 with *P. boreotis* and *S. lancea*, and 1 with *P. boreotis* and *Prosorhynchus paulus*. The most prevalent parasite was *P. cylindraceus*, and it occurred in 59% of the birds as the only acanthocephalan infection. All of the acanthocephalans were found at the junction of the second and third sections of the intestine. Hemor-

rhagic damage to the intestine was observed in 1 host.

**CESTODES:** *Aploparaksis dujardini neoarcticus* was described from a varied thrush by Webster (1955) from an unknown locality. In British Columbia, this tapeworm occurred in 48% of varied thrushes and 12% of robins. Nodules surrounding the scolices of *A. dujardini* were observed in the intestine of 1 varied thrush. *Aploparaksis turdi* was reported from robins and varied thrushes in Alaska by Williamson and Rausch (1965). It was not found in robins, and only 2 varied thrushes were infected in this study. *Dilepis undula*, *Monopylidium iola*, and *Passirilepis crenata* are parasites of *Turdus* spp. according to Schmidt (1986) and are now reported from varied thrushes. Infections of *D. undula* occurred in 6 juvenile robins with 105 of these massive tapeworms found in 1 host. Some cestodes were listed as unidentified because they lacked scolices and had missing hooks or immature proglottids.

**DIGENEA:** Although Canaris (1967) reported *Brachylaima pellucidum* Werby, 1938, from the intestine of a varied thrush in Oregon, I regard this species as *B. fuscatum*. *Brachylecithum mosquense* and *Lutztrema monenteron* were reported from the gall bladders and bile ducts of robins and varied thrushes in Idaho by Schell (1957). In this study, *B. mosquense* was found in 3 robins, with 2 having co-infections with *L. monenteron*. *Lutztrema monenteron* was the most abundant digenean in varied thrushes. *Leucochloridium cardis* and *L. turdi* were originally reported from robins from Japan and occurred in 4 varied thrushes. Because the worms found in the cloaca tended to be desiccated in frozen birds, intensity and prevalence may be greater than if fresh birds had been examined.

Three unusual digeneans were found in varied thrushes. *Mosesia chordeilesia* (Lecithodendriidae) was found in a single host with 37 specimens in the intestine. This species was originally reported in Michigan from insectivorous night-hawks (*Chordeiles minor*) and purple martins (*Progne subis*), with mayfly naiads as the intermediate hosts (Hall, 1959). Two specimens of *Tamerlania zarudnyi* (Eucotylidae) were found in the kidney tubule of 1 varied thrush. Because the eggs and gonads were larger than measurements from the single specimen reported by Penner (1939) as *Tamerlania melospizae*, I regard the specimens as belonging to the type species. Six specimens of *T. melospizae* were found in 1

robin in 1965 from Montana according to Canaris (pers. comm.). Two specimens of *Urotocus ros-sitensis* (Leucochloriidae) were recovered from the bursa Fabricius of 1 varied thrush. Although similar to *U. fusiformis* in body shape, the body lengths and egg size conform to the type species, whose anatomy was described by Williams (1960). Measurements of 3 newly reported digeneans are as follows:

1. *Leucochloridium turdi* ( $N = 10$ ; range in micrometers followed by the mean in parentheses): body length, 1,285–1,938 (1,637); body width at midbody, 469–816 (639). Oral sucker length by width, 196–388 by 262–428 (335 by 367). Pharynx length by width, 59–155 by 82–155 (121 by 128). Acetabulum length by width, 306–469 by 278–491 (384 by 392). Anterior testis, 98–188 by 71–164 (136 by 105); posterior testis, 82–205 by 65–131 (154 by 88). Ovary, 98–180 by 82 by 155 (144 by 122). Eggs ( $N = 65$ ), 20–28 by 10–18 (24 by 13.7).
2. Because the original description of *L. cardis* was based on 1 specimen, measurements are given for the 2 specimens found: body lengths, 1,540 and 2,162; body widths, 775 and 826. Oral sucker diameters, 425 and 449. Acetabulum widths, 458 and 490. Testes, 90–188 by 115–139. Ovary, 131–180 by 131–147. Eggs ( $N = 20$ ), 23–31 by 14–18 (25 by 16.5).
3. *Mosesia chordeilesia* ( $N = 10$ ; range in micrometers followed by the mean in parentheses): body length, 229–335 (288); body width at midbody, 123–196 (161). Oral sucker transverse width, 31–46 (38). Pharynx diameter, 13–26 (17). Acetabulum transverse width, 28–43 (35). Testes diameters ( $N = 12$ ), 38–59 (49). Ovary diameter ( $N = 6$ ), 28–38 (36). Cirrus pouch length ( $N = 5$ ), 64–102. Eggs ( $N = 30$ ), 18–26 by 10–14 (20.7 by 11.2).

**NEMATODES:** Four of the 5 species reported here have also been reported in robins (Read, 1949; Slater, 1967). *Capillaria obsignata* occurred as single infections in 14 varied thrushes and robins and as 8 co-infections with *C. quiscalis* in varied thrushes and as 5 co-infections in robins. Varied thrushes and robins are new hosts for *C. quiscalis*, originally described from bronzed grackles, *Quiscalus quiscula aeneus*, in Wisconsin by Read (1949). The 2 capillarids were differentiated from each other by the presence or absence of a vulvar appendage, the surfaces of the eggs in the females, and the shape and type

of sheath of the spicules in the males. The vulvar appendage of *C. quiscali* appeared more extended than originally described.

Measurements of *C. quiscali* are as follows: Females ( $N = 10$ ; range followed by the mean in parentheses in micrometers unless stated otherwise): body length, 6.9–11.6 mm (9.2); body width, 49–65 (54.6) at level of vulva. Proportion of anterior length at vulva to posterior length, 1:2. Number of stichocytes ( $N = 8$ ), 36–51. Vulvar appendage ranging in length from body width to 3 times the width ( $N = 8$ ), 57–164 by 33–57. Eggs with papillate surfaces ( $N = 20$ ), 50–64 by 24–31 (57 by 27). Males ( $N = 4$ ): body length, 4.6–9.5 mm; width at midbody, 37–65; spicule with broad tip, enclosed in cuticular, non-spinous sheath, lengths, 836–1,000.

### Discussion

It is difficult to sample "normal" hosts to determine their parasitic fauna, and in this study the findings were probably skewed because of the accidental and often violent nature of the deaths, the sex ratios, and ages of the birds. Twice as many male varied thrushes were examined than females, and it is interesting to note a similar sex skew in Slater's (1967) study. More juvenile robins than adults were examined in this small sample, and perhaps sampling more adults would have resulted in finding more helminth species.

In comparisons of parasites of turdid birds by James and Llewellyn (1967), *P. cylindraceus* was the dominant parasite in two-thirds of the song-thrushes, redwings, and blackbirds sampled. The generic composition of the parasite fauna was similar to that found in this study, reflecting the similarity of invertebrate intermediate hosts used as food items such as land snails, earthworms, and insects in the diets of robins and varied thrushes in the Northern Hemisphere. It is surprising that more studies on passeriform birds are not done because comparisons of their helminth fauna could indicate interesting differences in localities, food preferences, and interactions with intermediate hosts.

### Acknowledgments

I thank the following for the collection of birds: Garry Fletcher and students of Lester B. Pearson United World College of the Pacific, Vancouver Island; Dick Canning, University of British Columbia Vertebrate Museum, Vancouver; and Kevin Bell and Lynn Canyon, Ecology Centre,

North Vancouver. Al Canaris provided me with copies of student papers and lists of parasites of robins.

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